Prof. Purser's university career was very brilliant. He obtained a science scholarship in 1859, a large gold medal in mathematics, pure and applied, at the moderatorship examination in 1860; Bishop Law's mathematical prize, the MacCullagh prize, and in 1872 fellowship. At that time the fellows of Trinity College, Dublin, were supposed to be members of what had recently been the Established Church, and on their election were obliged to make a declaration which was partly of a religious character. Frederick Purser was a Moravian, and though no question would have been asked as to his special form of belief, he considered that he could not with truth make the required declaration, and consequently the fellowship he had won was declared vacant.

In 1873 Fawcett's Act abolished religious tests in the University of Dublin, and Purser began to read again for fellowship, which he gained for the second time in 1879. This has always been regarded as a wonderful feat by those who are best acquainted with the nature and difficulty of the fellowship examination in Trinity College. In 1902 Purser succeeded Tarleton as professor of natural philosophy, which professorship he held until his death. In 1905 and 1906 he was a vice-president of the Royal Irish Academy. He published in the Proceedings of the Academy some fine papers on the applications of Bessel's function to various difficult questions in physics. Some beautiful investigations of Prof. Purser are to be found in Tarleton's "Introduction to the Mathematical Theory of Attraction." Purser's publications, however, represent most inadequately the extent of his knowledge and his genius.

A more profound or accurate thinker than Prof. Purser it would be difficult to find. He was not merely a mathematician—he was also a metaphysician of the highest order. His paper, published many years ago in *Hermathena,* on "Hamilton's System of Natural Realism," was a work of rare ability. In that paper he showed that Hamilton's theory, when stripped of its absurdities and inconsistencies, was almost the same as the theory of Kant. As a metaphysician Prof. Purser was in the main a follower of Kant. Of geometrics of space of more than three dimensions he had a poor opinion, and looked upon them as little more than algebraical exercises.

Possessed of considerable wealth, he expended it with the greatest generosity. He was a munificent benefactor of Queen's College, Belfast, where his brother was a professor; of Trinity College, Dublin; and of the Royal Irish Academy.

Prof. Purser's chief fault—if it may be described as such—was one which appears to belong to the whole Purser family, that is, the fault of thinking far too little of his own powers and of the value of his own performances.

NOTES.

FOR the meeting of the British Association for the Advancement of Science, which is to take place this year at Sheffield on August 31 and following days, under the presidency of Prof. T. G. Bonney, F.R.S., the following presidents have been appointed to the various sections:—A (Mathematical and Physical Science), Dr. E. W. Hobson, F.R.S.; B (Chemistry), Mr. J. E. Stead, F.R.S.; C (Geology), Prof. A. P. Coleman; D (Zoology), Prof. G. C. Bourne; E (Geography), Dr. A. J. Herbertson; F (Economic Science and Statistics), Sir H. Llewellyn Smith, K.C.B.; G (Engineering), Prof. W. E. Dalby; H (Anthropology), Mr. W. Crooke; I (Physiology), Prof. A. B. Macallum, F.R.S.; K (Botany), Prof. J. W. H. Trail, F.R.S.; L (Educational Science), Principal H. A. Miers, F.R.S.

IN a speech delivered at Washington last week, Commander Robert E. Peary proposed, on behalf of the Peary Arctic Club, that the National Geographic Society should unite with the club in the organisation of a United States South Polar Expedition, to start in the autumn of this year. He promised that the Peary Club would lend the *Roosevelt* for the purposes of the expedition, but stated that he himself would be unable to assume the command in person. The proposal has since been accepted by the directors of the National Geographic Society. All proposals which aim at the extension of knowledge of the Antarctic area are to be welcomed, but now that so many projects for the exploration of the south polar regions are to the fore, it is necessary to consider how Commander Peary's scheme stands in relation to other Antarctic enterprises. The only expedition at present in the field is that under Dr. Jean Charcot on board the *Pourquoi Pas,* which a year ago penetrated the Antarctic regions to the south of South America. It intended to make its way westwards, and, if possible, undertake a "dash" to the South Pole from the ship's winter quarters. If the expedition makes its way northwards again this season, news of it should be received in the course of the next two months. The British expedition now in course of organisation by Captain Scott will make its headquarters in McMurdo Sound, and, if possible, land a small party on King Edward VII. Land. The expedition proposed by Commander Peary will not interfere with these plans in any way, since it is suggested that its base should be on the opposite side of the Antarctic continent, that is to say, on Coats Land, in the Weddell Sea, south of the Atlantic Ocean. This is the coast which Dr. W. S. Bruce, its discoverer, wishes to make the base of a Scottish Antarctic expedition, and Sir Ernest Shackleton has also stated that if he should go south again he would probably attempt to reach the Pole from the side of the Weddell Sea. An alternative base suggested by Sir Ernest Shackleton is Gaussberg, to the south of the Indian Ocean, off which the German expedition under Dr. Von Drygalski wintered in 1902. Gaussberg is situated on the Antarctic circle; the most southerly known point of Coats Land is just beyond the seventy-fourth parallel, or 960 geographical miles from the Pole, while Cape Royds, in McMurdo Sound, where Captain Scott proposes to winter, is in between 77° and 78° south latitude, nearly 750 geographical miles from the Pole.

MR. W. BATESON, F.R.S., and Dr. H. T. Bovey, F.R.S., have been elected members of the Athenæum Club under the provisions of the rule which empowers the annual election by the committee of nine persons "of distinguished eminence in science, literature, the arts, or for public services."

THE Julius Thomsen memorial lecture of the Chemical Society will be delivered on February 17 by Sir Edward Thorpe, C.B., F.R.S.

FOUR lectures on "The Anatomy and Relationships of the Negro and Negroid Races" will be delivered in the theatre of the Royal College of Surgeons, Lincoln's Inn Fields, by Prof. Arthur Keith (conservator of the museum), on February 14, 16, 18, and 21. Ladies and gentlemen will be admitted to the lectures on presenting their private visiting cards.

THE annual conversazione of the Selborne Society will be held on Friday, February 18. An address will be given by Sir John Cockburn, K.C.M.G., and a lecture on "Selborne and its Associations with Gilbert White" by Mr. E. J. Bedford. There will be a large display of exhibits under the microscope, as well as exhibits of natural-history specimens, nature photographs, and other objects of scientific interest.

SIR PATRICK MANSON has been elected a correspondant of the Paris Academy of Sciences in succession to the late Sir Burdon Sanderson.

ACCORDING to a Reuter telegram from Berlin, published in the *Times* of February 3, the expedition dispatched to German East Africa to collect dinosaurian remains is proving successful. A femur, measuring 6 feet 10 inches, is specially mentioned, on account of being nearly 2 feet longer than the corresponding bone of the Carnegie Diplodocus.

THE King has presented to the natural history branch of the British Museum the skeleton of his famous thoroughbred "Persimmon," which has been set up by Rowland Ward, Ltd., Piccadilly. This is the first complete skeleton of a thoroughbred to be exhibited in the museum, the skeleton of "Stockwell," which is also contained in the collection, being represented in the exhibited series merely by the skull and the limbs of one side. In common with most or all thoroughbreds with the blood of "King Tom" in their veins, "Persimmon" exhibits a trace of the sinuous skull-profile characteristic of Arabs. The museum previously possessed a statuette of "Persimmon," presented in 1905 by H.R.H. the Prince of Wales.

THE first ordinary meeting of a new society, formed by the amalgamation of the Society of Engineers and the Civil and Mechanical Engineers' Society, was held on Monday, February 7, at Caxton Hall, Westminster. Mr. Diogo A. Symons, the first president of the new Society of Engineers, delivered an inaugural address. Referring to the examination which is to be the qualification for fellowship of the society, he believes that its introduction will have the same beneficial effect as has been the case in the Institution of Civil Engineers. Proceeding to more general subjects, he directed attention to the value of workshop training to engineering students, whether they intend to take up the civil or the mechanical branch of the profession. Speaking of the education of young engineers, Mr. Symons emphasised the importance of a thorough grounding in fundamental principles before any attempt at specialisation is attempted, and laid stress on the advantage of gaining engineering experience with a contractor on public works. The tendency of engineering students to accept salaried appointments after too brief a training was deprecated, because such appointments usually involve loss of valuable instruction and experience.

ACCORDING to the *Pioneer Mail* of Allahabad, a preliminary astronomical conference was held recently at Papanasanum, and another will be held later at Kaladi (Travancore Native State). Astronomers from all parts of India, representing the three different schools of astronomy, viz. Siddhanatha, Vakya, and Drigganitha, are being invited. It is also proposed to give a prize of not less than Rs. 100 (one hundred) to each of these different schools of astronomy; but if Pundits from distant parts cannot come to the conference, they may send written papers in Sanskrit or English. The objects of the conferences are to check the irregularities in calculations now found in the Indian Almanac, and to arrive at some satisfactory solution with reference to the system of calculation to be adopted in the making of future almanacs.

THE second Congrès International du Froid will be held at Vienna on October 6–12, before the close of the International Sporting Exhibition, and the University has been lent for the meetings. Briefly, the subjects to be discussed are the science of cold; the industrial production of cold; the application of cold to alimentation and to other industries; transport; and legislation. The Archduke Leopold Salvator, at the request of the Emperor of Austria, is acting as patron of the congress, and receptions will be given to the delegates by the Court and by the towns of Vienna, Budapest, &c. Papers must be submitted to the Association International du Froid through the British committee. Full particulars of the congress may be obtained from Mr. R. M. Leonard, honorary secretary for the United Kingdom, 3 Oxford Court, Cannon Street, London, E.C.

THE scientific expedition dispatched to Dutch New Guinea by the members of the British Ornithologists' Union has sustained a great loss by the death of Mr. Wilfred Stalker, one of its most skilled naturalists. At the present time no details are known beyond the melancholy fact that he was drowned on January 9. The news was received by telegram from Batavia on February 1, and had probably been forwarded by steamer from the Aru Islands. With this telegram Mr. Ogilvie-Grant received a long letter from Mr. Stalker, written from "Amboina, December 24, 1909." In this he stated that he had been successful in engaging the services of 150 carriers, and was expecting the arrival of Mr. Walter Goodfellow, the leader of the expedition, in a few days. He also mentioned the dispatch of various cases containing collections of mammals and birds, &c., which had been procured in Central Ceram, and are likely to prove of great interest. Mr. Stalker left England about a year ago, and proceeded to the Aru Islands to obtain living examples of birds of paradise for Sir William Ingram. It had been arranged that, after completing this engagement, he should join the other members of the British Ornithologists' Union expedition, filling up his time until their arrival by collecting natural-history specimens and in making the preliminary arrangements for transport in New Guinea. His letter, mentioned above, states how usefully he had employed his time in carrying out his instructions. Mr. Stalker had already had considerable experience of life in New Guinea, having spent several years (between 1904–6) at the gold mines on the Mambare River, in the northern part of the British territory. It was then that he first began to collect specimens for the Natural History Museum. Subsequently, at the suggestion of Mr. Oldfield Thomas, who had discovered his great ability in trapping and preparing mammals, he was sent by Sir William Ingram and the Hon. John Forest to Alexandra, in the northern territory of South Australia, and in 1907 to Inkerman, in East Queensland. In both these places he did admirable work, and formed fine collections of mammals, which were presented by his patrons to the Natural History Museum. In 1909, in company with Mr. C. R. Horsburgh, he again visited British New Guinea and the Aru Islands on behalf of Sir William Ingram, and was successful in bringing back a large number of living birds of paradise, including a male of the beautiful blue bird of paradise (*Paradisornis rudolphi*), which had not previously been brought to Europe alive. Early in 1909, after a short stay in England, he again started on the present undertaking, when he so unfortunately lost his life. Mr. Stalker was quite a young man—only thirty-one years of age—having been born on January 17, 1879, and it is sad to think that the successful career of this talented naturalist should have been terminated so early and in so tragic a manner.

DR. C. C. HÖFFEUS, of Shöneberg, near Berlin, has favoured us with a copy of the *Leipziger Tageblatt* for

July 24, 1909, in which he recommends the alliaceous plant locally known as "knoblauch" (*Allium ursinum* and also *A. acutangulum*) as a table-vegetable. These plants grow abundantly at Rosenthal, where cabbages cannot easily be raised, and, when properly cooked, are stated to have a flavour superior to that of spinach, the garlicky odour entirely disappearing after a prolonged soaking in water and the application of salt.

THE Transactions and Proceedings of the Perthshire Society of Natural Science for 1908–9, vol. v., part i., contain the report of an address delivered in March last by the president, Mr. W. Barclay, on the proposal to re-afforest large areas in Scotland. The scheme is cordially approved in the address, and a resolution was carried at the meeting in support of the recommendation of the Royal Commission that a State forestry department should be established, with power to put the work in hand. The scheme, it was urged, would eventually prove a financial success, and would provide present employment.

No. 2 of section *b* of vol. xxviii. of the Proceedings of the Royal Irish Academy is devoted to a list of the Neuroptera of Ireland, by Messrs. J. J. F. X. King and J. N. Halbert. This catalogue, which is to replace one published more than twenty years ago by one of the present authors, it is hoped will form a standard of reference for future observations. Although our knowledge of the native dragon-flies, like that of the other Neuroptera, is far from complete, there is no doubt that Ireland possesses fewer of these insects than Great Britain. Twenty-five species were included in the Irish list of 1889, but the number must now be reduced to twenty-three. The study of the may-flies has been so neglected that there are few changes to record from the old list.

ANGLER-FISHES (Pediculati) and their habits form the subject of a richly illustrated paper by Dr. T. Gill, published in the Smithsonian Report for 1908. Nearly all the species inhabiting shallow or moderately deep water are provided with an angling apparatus—the "illicium"—which undoubtedly serves as a rod, line, and bait, although the action is probably automatic. Certain stoutly built members of the group are, however, denizens of deep water, and in these the fishing apparatus has been modified into a rod with a bulb furnished with a phosphorescent terminal portion, while the surrounding "bait" has likewise been specialised and augmented; and, in addition to all this, a lantern and worm-like lures are present. How efficient this apparatus must be will be apparent to all who have witnessed salmon-spearing by torchlight.

GREAT interest attaches to an article by Dr. R. S. Lull, in the January number of the *American Journal of Science*, on the distribution of dinosaurian reptiles. It should be premised that dinosaurian remains are unknown from Central and North-eastern Asia, which may be attributable either to our lack of knowledge of the palæontology of that area or to the circumstance that these reptiles never occurred there. The theropod group is believed to have originated in North America—"Laurentia"—whence they migrated in one direction, probably at a late epoch, into South America, and in another, by way of Greenland and Iceland, to Europe, and thence to India, Africa, Madagascar, and Australia. The Sauropoda, on the other hand, are regarded as an Old World group, migrating early in the Jurassic into the great southern continent of the Old World, "Gondwanaland," and also into the New World. In the southern hemisphere they had a distribution nearly as extensive as that of their carnivorous cousins, and survived long after they had disappeared from the north, occurring in India during some part of the Cretaceous, and in Patagonia—their last stronghold—during the Laramie, or topmost Cretaceous. On account of their semi-aquatic habits, they were independent of complete land-connections, and could thus extend their migrations across areas impassable to the strictly terrestrial Ornithopoda (Orthopoda), as typified by the iguanodon. This may be the reason why the latter group never succeeded, so far as our present information goes, in penetrating the southern hemisphere, although it is possible that the date of their radiation may have been later, when communication between Europe and Gondwanaland was interrupted; while it has also to be borne in mind that, judging from their dentition, they were dependent upon a particular kind of food. Originally the Ornithopoda were probably a North American group, and the horned, or ceratopsian, section appears to have been restricted to the western continent.

THE seventh volume of the *Journal of Experimental Zoology*, which was completed with the November (1909) number, contains no fewer than a dozen memoirs on regeneration in animals. Now that the study of this subject includes the effect of drugs upon the rate of regeneration, with the whole pharmacopœia on the one hand and the entire animal kingdom on the other from which to select material for experiment, there seems no reason why such researches should ever come to an end. Of course, the same may be said of almost any other branch of biological investigation, and, indeed, the rapid accumulation of literature at the present time threatens either to swamp biologists altogether or else to force them to take refuge in a very narrow specialisation.

THE problem of sex-determination continues to receive a very large share of attention from cytologists. One of the most notable recent contributions to the already extensive literature of the subject is a memoir, by Prof. T. H. Morgan, entitled "A Biological and Cytological Study of Sex Determination in Phylloxerans and Aphids," published in the *Journal of Experimental Zoology* for September, 1909 (vol. vii., No. 2). In addition to the author's own observations, this paper contains a critical review of the recent literature of the subject. The theory of accessory chromosomes and the Mendelian interpretation of sex are dealt with. It is admitted, however, that the problem has as yet by no means reached a satisfactory solution. Prof. Morgan regards the quantitative interpretation of sex-determination as only the first rough approximation to such a solution, and he thinks that the accessory chromosome may follow sex or be associated with other differences that determine sex rather than be its sole cause.

THE genus Œnothera has received world-wide attention from botanists since Prof. de Vries founded his mutation theory largely on the variations he obtained by cultivation of certain wild forms. In the hope that North American and European botanists may be induced to make a careful examination of other wild colonies, Mr. R. R. Gates, who has already investigated several of the variants, has compiled an analytical key to the principal segregates and mutants of the genus, which is published in the twentieth annual report of the Missouri Botanical Garden. Ten species and fourteen forms derived from *Œnothera Lamarckiana* are delimited.

THE consequences of cattle-grazing in Indian forests are discussed by Mr. J. W. Best in the *Indian Forester* (November, 1909), where he notes the results of his observations in a division of the Central Provinces. Grazing is restricted to definite areas where least harm can be done, and, as a rule, goats are prohibited entirely from reserved forests. The destruction of young trees is, of course, the chief danger, since it leads to uneven regeneration. A noticeable feature is the increased development of certain trees with protective devices, such as armed species of Gardenia and the thorny *Zizyphus Oenoplia*. The saplings of *Butea frondosa* also escape the ravages of the cattle; and since this tree is valuable for the cultivation of lac insects, it is recommended that it should be extensively grown on grazed areas.

SEVERAL facts of importance in connection with the development of monocotyledonous embryos are recorded by Mr. W. E. Evans in an account of the germination of Asparagus, Ruscus, and Polygonatum appearing in Notes from the Royal Botanic Garden, Edinburgh (August, 1909). In the case of Asparagus, the axis of the seedling soon breaks through the cotyledon sheath, although the first two internodes do not elongate, so that one or two small hypogeous scale leaves are found at the base. The buds in the axils of these leaves give rise to the first beginnings of the sympodial rhizome. The primary root thickens, and presents the appearance of a pull-root. The germination of Ruscus and Polygonatum seedlings is similar, but several basal scale leaves are formed, and in Polygonatum the hypocotyl takes part in the formation of the fleshy rhizome.

ON the island of St. Vincent cotton and arrowroot provide the most valuable agricultural export commodities, while cacao and sugar are of subsidiary but appreciable importance. The report for 1908–9 of the botanic station, published with the reports of other agricultural establishments, presents several interesting facts concerning these economic products. The Sea Island cotton, by reason of favourable soil and climate in the coastal districts where it is grown, has maintained its reputation as the best quality produced in the West Indies, and the quantity exported during the year has increased in amount; but lower prices and bad weather have caused a small decrease in the area planted and in the output. Arrowroot can be grown in all parts of the island, and the supply could be increased if fresh markets were obtainable. A feature of the cacao cultivation is the necessity for shade, for which purpose the leguminous tree *Gliricidia maculata* is utilised.

THE Department of Lands, New Zealand, has sent us a copy of the surveyor-general's report for the year 1908–9. The greater part of the report is occupied with an account of the progress of the different surveys, but some of the notes and appendices are of general interest. The Milne seismograph at Christchurch registered forty-six earthquakes, the average annual number during the preceding six years being eighty-two. The record of the Messina earthquake will prove of considerable interest, as Christchurch is not far from the antipodes of Calabria. A foundation has been laid for the measurement of secular movements of the New Zealand coasts in the determination of the mean sea-level at Auckland, Wellington, and four other ports, and its reference to permanent bench-marks on the adjoining shores. The Wellington Harbour gauge-charts exhibit many instances of very pronounced seiche-oscillations, much more so than at the other ports, and it is found that in most cases they are accompanied by a change of wind from north to south or *vice versâ*, the wind at the time being generally strong.

THE University of California has issued, as the fourth part of vol. vii. of its Proceedings, a report on the shell-mounds of the San Francisco Bay region, by Mr. N. C. Nelson. The environment of these shores favoured occupation by numerous fishing tribes, and no fewer than 425 mounds, some of considerable extent, have been mapped and described. The culture disclosed in these mounds is generally uniform and of the Neolithic type, rude stone implements being found only in inconsiderable numbers. These people buried their dead in the collections of shells and other débris in the neighbourhood of their dwellings, and a large collection of osteological remains has been made which still awaits examination. It seems probable that the builders of these mounds were of the same race as the present Indians of the neighbourhood, but it is at present impossible to fix the approximate date at which they may have been formed. They are certainly of considerable age, because some species of oysters and mussels the shells of which have been recognised in the mounds have disappeared from the locality. From calculations of the daily supply of fish required by the group of families occupying a single site, Mr. Nelson estimates that the accumulation of shells in one mound may have extended over 3500 years.

THE Bureau of Science of the Government of the Philippine Islands has published parts iv. and v. of vol. iv. of its Bulletin, dealing respectively with medical sciences and general science in respect to the Philippine Islands. The former of these two parts, compiled with the assistance of the staff of the Philippine Medical School, presents a very complete medical survey of the town of Taytay, showing the diseases prevalent in the community and the conditions under which it lives. "While the conditions of the town are generally unsanitary, the death-rate varying in different years from 27·91 per 1000 to 45·42 per 1000, they at times become most unsanitary. Under the present conditions epidemic diseases such as cholera, typhoid, and bacillary dysentery are likely to occur from time to time." Various recommendations in regard to vaccination and water supply are urged to remedy this state of unhealthiness. The part which deals with general science contains papers on geology, road-making materials, and anthropology. The anthropological contributions contain a vast number of measurements which must ultimately prove of great value to the ethnologist, despite the accompanying absurd classification of the inhabitants into Iberian, Cromagnon, Australoid, Alpine, Adriatic species, varieties, &c.

A MEMORANDUM on recent weather and on the probable character of that of January and February, 1910, in the Punjab and north-west frontier-province of India, published by the Director-General of Observatories, concludes that the total precipitation in that locality will probably reach or exceed the average in the latter months. This inference is chiefly based on the fact that during fifteen out of eighteen years since 1890–1 an excess or a defect in the rainfall in December has been maintained in the two following months. In December, 1909, the area in question had an excess of 1·4 inches over the normal amount. The Director-General states that another favourable sign is that the vertical gradients of barometric pressure were abnormally steep during December.

IN the *U.S. Monthly Weather Review* for June last, just received, Prof. A. G. McAdie refers to the interesting and somewhat important problem of the prevention of damage by frost in orchards, &c. He states that the great mass of experiments made in California orchards shows that direct heating of the air by open fires has not been sufficient to prevent injury at times of very low temperature, and quotes a recent experiment of a careful observer there during a night when the temperature ranged between

19° and 24°. Very large amounts of wood and wet hay were burned, but, the air being dry and calm, the smoke rose straight upwards, and although three large fires were maintained between 20 and 30 feet of a certain tree, the temperature in the vicinity of the tree remained for some hours about 20°. Prof. McAdie's conclusion is that a proper cover spread some feet above the surface is the most effective means of protection of plants. When necessary, this may be supplemented by the use of small stoves, &c., placed on the ground.

A NEW form of watch-glass clip has been submitted for inspection by Messrs. J. J. Griffin and Son, Ltd., of Kingsway, London. It consists of two small metal rods joined by steel spring wire to form a holder, of lenticular section, which can slide over a pair of watch-glasses having their edges in contact. When desired, it can also be used for a single glass. The hold is very firm, and the clip is easily affixed and detached; it is also lighter, neater, and less cumbersome than the older brass contrivances. Within limits, the same clip will serve for different sizes of glass; but two sizes of clip are recommended for ordinary use, namely, those taking glasses up to 1¾ inches and up to 2¾ inches in diameter respectively.

THE December (1909) number of the Journal of the Institution of Electrical Engineers contains a paper read before the institution in May last by the president, Mr. W. M. Mordey, on some tests of the Mansbridge paper condensers described in these columns a year ago, and of the Moscicki glass condenser, or engineering form of the Leyden jar. Mr. Mordey finds that the losses on alternating current circuits only amount to about 0·6 per cent. in the case of the Mansbridge and 1 per cent. in that of the Moscicki condenser, the former being tested up to 500 and the latter up to 10,000 volts. In these circumstances the author points out that the general introduction of condensers on alternating circuits to compensate for the lag of current due to inductive loads becomes a possibility of the near future.

THE agenda paper of the general meeting of the Société française de Physique on January 21 contains, in addition to the business items and *résumés* of the papers read at the last meeting, a balance sheet for the session 1908–9. From it we gather that the society now has about 1500 members, almost equally divided between Paris, the rest of France, and foreign countries. The subscriptions for the year amount to 600*l.*, and the society has 10,000*l.* invested in French railways. The cost of printing the quarterly *Bulletin des Séances,* a volume of 300–400 pages per annum, and the fortnightly agenda and *résumé* of papers read, is about 140*l.*, and the cost of distribution of these publications to the members amounts to 130*l.* We offer the society our congratulations on its strong position and on the excellent work it is doing.

THE reconstruction of the Tyne North Pier, which has just been completed, forms the subject of illustrated articles in *Engineering* and in the *Engineer* for January 28. The importance and difficulty of the work executed by the contractors, Messrs. Sir John Jackson, Ltd., under the direction of Sir John Wolfe Barry and Messrs. Coode, Son, and Matthews, may be understood from the fact that, in exceptional storms, waves 35 feet in height from trough to crest have been recorded at the mouth of the Tyne, and, owing to the deep water, are propagated almost so far as the pier itself. The old pier met its death-blow during the great gale of January, 1897, when 110 feet of the wall on the seaward side fell outwards. As reconstructed, the North Pier is 2900 feet long, and the entrance to the harbour is now 1180 feet wide. From the foundations on the shale, which was dressed level by divers, the pier has been built of concrete blocks, with granite facing on the outer courses. The depth of foundation below low water of spring tides varied from 28 feet to 44½ feet, being, on the average, about 20 feet more than in the old structure. The width at quay-level is 37 feet, and at low-water level 50 feet. Access is obtained during stormy weather to the lighthouse and machinery for blowing the fog signal at the pier-head through a tunnel, which is constructed under the promenade.

A DESCRIPTION is given in *Engineering* for January 28 of the system of photographic surveying from balloons devised by Captain Scheimpflug, of Vienna. The inventor's experiments have been going on for some years, and formed the subject of a lecture recently given by him before the Physical Society of Frankfort-on-Main. Briefly, the panorama camera consists of a central camera having a horizontal plate and seven inclined lateral cameras surrounding the former. The cameras are rigidly connected with one another, and the shutters are released simultaneously, so that a very large field is secured. Horizontal projections of the inclined negatives are produced by means of a special apparatus, when the resulting panorama views show a centre heptagon surrounded by seven other trapezoidal photographic sheets. The diameter of country represented will be about five times the height of the balloon and camera at the moment of exposure. Photographs are taken at rapid intervals while flying over the ground, and it is desirable that the resulting views overlap by more than half. The nadirs of successive photographs will then be discernible on the same plate. Heights can be obtained from the photographs by means of another apparatus—the zone transformer. The inventor estimates that a survey of German South-west Africa by his system could be accomplished in fifteen years at a cost of 2,000,000*l.*, as compared with a plane-table survey, which would occupy 150 years at an estimated cost of 10,000,000*l.* There certainly seems to be a field for photographic surveying from airships.

THREE new volumes, Nos. 6–8, have been added to the series of books on Egypt and Chaldæa published by Messrs. Kegan Paul, Trench, Trübner and Co., Ltd. They form a second edition, revised and enlarged, of part of Dr. Budge's work on the "Book of the Dead," published under the title of "The Chapters of Coming Forth by Day." The subtitle describes the volumes as an English translation of the chapters, hymns, &c., of the Theban rescension, with introduction, notes, &c. The first edition of Dr. Budge's work, of which the present translations formed the third volume, was reviewed at length in our issue for February 10, 1898 (vol. lvii., p. 337). The translation given in the present series is not merely a reprint from the original issue, for it has been carefully revised and compared with the original texts, and many brief explanatory notes have been added. More than four hundred vignettes, taken from the best papyri, have been reproduced in these volumes at the heads of the chapters, the general contents of which the ancient Egyptian scribes and artists intended them to illustrate. These translations form a representative collection of the various compositions which the Egyptians inscribed upon the walls of tombs and sarcophagi, coffins and funeral stelæ, papyri and amulets, in order to ensure the well-being of their dead in the world beyond the grave. The price of each of the present volumes is 5*s.* net.

THE twelfth edition, revised, of Mr. W. T. Lynn's small volume on "Celestial Motions" has been published by Messrs. S. Bagster and Sons, Ltd., price 2*s*. net. The book is an easy introduction to the main facts of astronomical science, and the frequent re-issues enable the author to keep it up-to-date.

MR. JOHN BROWNING has issued the fourth edition, re-written and revised, of his concise little book "How to Work with the Spectroscope." The book provides beginners with a handy guide to the use of spectroscopes of various kinds, including McClean's star-spectroscope, the microspectroscope, and others; and we welcome it as a simple means of extending the circle of observers of spectroscopic phenomena. The price of the book, with a coloured chart of spectra, is 1*s*. 6*d*., and without the chart, 9*d*.

OUR ASTRONOMICAL COLUMN.

NEW ELEMENTS FOR HALLEY'S COMET.—In a note appearing in No. 419 of the *Observatory* (February, p. 104), a set of elements for Halley's comet, deduced by Mr. C. J. Merfield from the observations made since the re-discovery of the comet in September last, is compared with the elements predicted for this return, as follows:—time of perihelion passage, April 19·6394 (G.M.T.), $\omega = 110° 43' 24''$ (=predicted+68″), ☊ $= 57° 15' 56''$ (=predicted−16″), $i = 162° 12' 34''$ (=predicted−8″), $e = 0{\cdot}967300$ (=predicted+0·000019″), and $\mu = 46{\cdot}6723''$ (=predicted+0·003″). From these elements Mr. Crommelin has calculated the conditions for the comet's transit over the sun, and finds that the first contact should take place on May 18d. 14h. 22m. (G.M.T.) in position angle 264°. Thirty minutes later the centres of the two bodies will be at their least separation, the comet being 62″ south. Last contact should occur at 15h. 22m., in position angle 92°, and the horizontal parallax of the comet will be 54·4″, or 45·7″ relative to the sun. The transit will be visible in Australia, the Pacific, and Asia, and it is sincerely to be hoped that careful and comprehensive observations will be made, for they may provide useful additions to our knowledge concerning the constitution of the denser portions of the comet.

In the same journal Father Cortie discusses the alleged Papal excommunication of Halley's comet ("The Devil, the Turk and the Comet") in 1456, and quotes conclusive evidence showing the story to be a myth.

STUDIES OF SOLAR AND STELLAR SPECTRA.—In two recent communications to the Academy of Sciences (*Comptes rendus*, Nos. 1 and 3), Count A. de Gramont publishes some interesting results as to the occurrence of what he designates *raies ultimes* in the spectra of the sun and various stellar types.

The *raies ultimes* of an element are those lines which persist in the spectrum throughout the range of flame, arc, and spark conditions. Treating different alloys in which the quantity of a component continuously decreases, M. de Gramont finds that the first lines to disappear from the spectrum are the "spark" lines, then those produced in the arc, and lastly the "flame" lines; the most persistent lines are the *raies ultimes*. On the hypothesis that the spectra of the various regions of the sun are dissociation spectra, and that their differences are due principally to variations of the proportions of elements present, M. de Gramont hopes to find indications which will show, more or less, the regions of the sun, and he gives a list of the most persistent and the most sensible lines of seventeen elements already traced in the solar spectrum.

M. de Gramont further points out that the absence of the lines of the metalloids, &c., from the solar spectrum should not be accepted as proof that these substances do not exist in the sun, for he has already shown that the "ultimate" lines of many of them exist in the more refrangible part of the spectrum which our atmosphere absorbs. The "ultimate" lines of gold occur at λλ 2676·0 and 2428·1, and it is suggested that this is the reason that gold has, so far, been considered as absent from the sun.

In the second paper M. de Gramont considers the distribution of *raies ultimes* in different stellar types, having studied for this purpose the Harvard classifications, the numerous publications of Sir Norman Lockyer, and the works of Sir William Huggins. Using the nomenclature of Miss Cannon, in the Draper Catalogue, he finds that these ultimate lines do not occur in the hottest stars, but make their appearance in B8A, the Algolian type, and generally increase in intensity as the lower types are reached. In the *c* division the "ultimate" lines appear at a stage later, and in less numbers, than in the *a* division. M. de Gramont points out that the *c* division corresponds with Sir Norman Lockyer's "ascending series," of which the most characteristic types are the Rigelian and the Cygnian, in which predominates the "test spectrum" or spectrum of enhanced lines. The presence of oxygen and nitrogen lines in the helium stars, lines dissimilar to the ultimate lines, is taken as an indication that in such stars powerful electrical discharges are in action.

M. de Gramont concludes by suggesting that the presence or absence of "ultimate lines" in the spectra of stars may furnish valuable indications of the relative temperatures, or the stage of evolution, of the different types, and is equally applicable to the Harvard classification and the conceptions of Sir Norman Lockyer.

MARKINGS ON MARS.—Too late for insertion at the end of his letter on Martian markings as seen with small and large telescopes, published in last week's NATURE (p. 397), Prof. Lowell writes:—"It will prove of interest to students of the subject that this optical shattering of lines, due to a large glass, is precisely what M. Antoniadi observed at Meudon in his observations of Mars. He saw in the canals, in place of lines, a tesselated series of dots. His observed mosaic effect is the exact theoretic effect that a large aperture should produce on continuous lines such as the canals, and always does produce in the case of the rings in the images of a star."

ELEMENTS AND EPHEMERIS FOR TEMPEL'S COMET (1873 II.).—In No. 4386 of the *Astronomische Nachrichten* M. Maubant gives the elements and a search-ephemeris for Tempel's second comet, which is expected to pass through perihelion in the near future. The conditions are not favourable for observation.

THE NEW COMET (1910*a*).

ALTHOUGH by its increasing distance from the sun and the earth, and by its apparent recession into the sun's rays, the great comet of 1910 is becoming less popular as a spectacle, the interest among astronomers as to the results accruing from the mass of observations will doubtless continue for a long period. From observers situated in many parts of Europe and Africa we are receiving further evidence of this comet's title to rank among the "great comets" of history.

In sending us the drawing here reproduced, Father Cortie encloses some valuable observations of the comet's appearance on January 26. The drawing was made by Mr. William McKeon, an assistant at the Stonyhurst College Observatory, at 6 p.m. January 26, and in making the observations a small pocket telescope of 1½ inches aperture and 17 inches focal length was employed. The following are Mr. McKeon's remarks concerning the comet's appearance at the time:—"Nucleus of the comet bright and sharp; no merging into the tail, magnitude 2. Nucleus of comet 2° S. and 7° W. of Venus (estimated). The tail terminated at a star of about the seventh magnitude some 8° N. by E. of the head. The star to the right of the comet (N. by W.) was of about the third or fourth magnitude."

Father Cortie identifies this latter star as α Equulei, magnitude 4·1, and thence deduces that the length of the tail, as seen in the small telescope employed, was about 7½°. Naked-eye observations by himself showed the tail extending almost to ε Pegasi, which would make its length 12°; its breadth at the end, he estimated, was about 3°. The sky was perfectly clear, and the tail of the comet